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Spring call counts of some Galliformes in the Pipar Reserve, Nepal

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In continuance of a long-term population monitoring project, we conducted dawn call counts in the Pipar Pheasant Reserve in Annapurna Conservation Area in Nepal between 28 April and 5 May 1998. The aim of these counts is to obtain abundance indices for three Galliformes species in the area, for comparison with the results obtained periodically since 1979. We registered less calling in 1998 than in 1991 for both Satyr Tragopan *Tragopan satyra* and Koklass Pheasant *Pucrasia macrolopha*, but across all years these differences are not statistically significant. Thus it appears that these populations are stable, but additional call count points are needed to provide a more reliable picture of the state of Galliformes in the reserve. Opening of the reserve for the purposes of wildlife tourism may be beneficial for the area, providing tangible returns to local people, but such schemes need to be designed carefully so that irreversible damage is not done to the area. This can be achieved by either limiting the number of tourists allowed inside the area, increasing the size of the reserve to include adjoining forests of similar character, or both.

INTRODUCTION

Pipar Pheasant Reserve in west-central Nepal holds five of the eight pheasant species of Nepal (Lelliott and Yonzon 1980, Fleming *et al.* 1979). It lies in the Annapurna Himalaya, one of the most intensively trekked regions of the country.

Pipar was 'discovered' in 1976 as a potential pheasant conservation area, and ecological studies on pheasants were conducted there in the late 1970s and early 1980s (Lelliott and Yonzon 1980, Lelliott 1981). The area was declared a reserve with endorsement from the World Pheasant Association, which then supported this pledge through the provision of wildlife guards, resources for

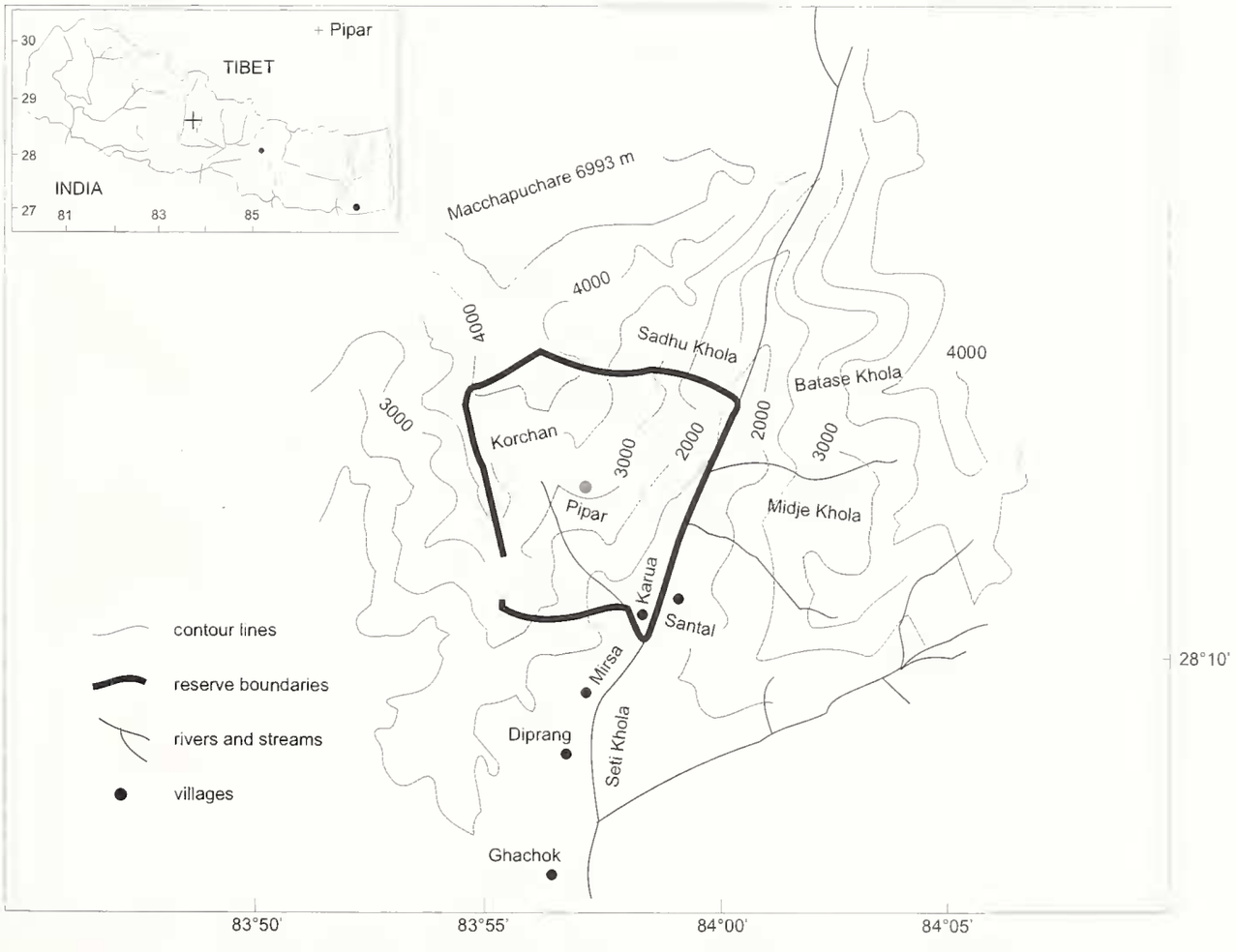

Figure 1: The Pipar study area and its location in Nepal (inset).

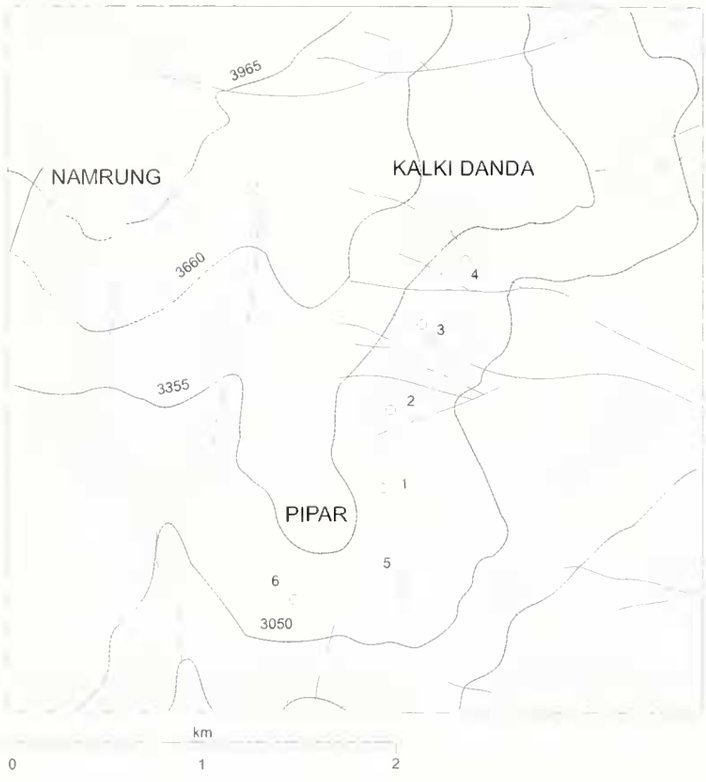

Figure 2: Location of call count points in the study area.

local schools, and periodic monitoring of pheasant populations (Kaul 1995, Kaul and Shakya 1998). A management plan was formulated for the sanctuary by Forester and Lelliott (1982) and a base-line habitat survey was conducted by Picozzi (1984).

Since the late 1970s seven surveys have been conducted in Pipar by various teams (see Lelliott and Yonzon 1980, Tamarkar and Lelliott 1981, Yonzon 1982, Picozzi 1987, Howman and Garson 1993, Kaul and Shakya 1998). The main objective of these was to monitor pheasant populations in a standard fashion, using counting point locations originally specified by Lelliott (1981). The principal species of pheasants found there are Satyr Tragopan *Tragopan satyra*, Himalayan Monal *Lophophorus impejanus*, Koklass Pheasant *Pucrasia macrolopha* and Blood Pheasant *Ithaginis cruentus*. The Cheer Pheasant *Catreus wallichii* does not occur within the reserve but is present close by, west of the Kali Gandaki river. Picozzi (1987) also recorded the occurrence of Hill Partridge *Arborophila torqueola*, Snow Partridge *Lerwa lerwa*, and the Himalayan Snowcock *Tetraogallus himalayensis* in Pipar.

As part of this ongoing monitoring programme, we visited Pipar in spring 1998 to survey pheasants using call counts and by walking trails. We also sought to collect data on other Galliformes species known to occur in the area. Here we report on this work, compare our data with those collected during previous surveys and discuss the possible introduction of limited tourist trekking in the area.

STUDY AREA AND METHODS

The Pipar Reserve (28°25'N 83°57'E) encompasses an area of approximately 46 km^2 and is located on the west bank of the river Seti in the Annapurna Himalaya, Nepal (Forester and Lelliott 1982). Our study area lies in a depression known as the 'Pipar bowl' (Fig. 1) at 3,300 m on a spur running southwards from the Machapuchare peak (6,990 m).

The vegetation of the area ranges from subtropical near the River Seti through temperate to alpine grasslands (Dobrémez and Jest 1971, Stainton 1972). Dominant trees in the canopy are *Quercus lamellosa*, *Sorbus* sp., *Rhododendron arboreum*, *Q. semecarpifolia*, *R. barbatum*, *R. campanulatum* and *Betula utilis*. The main species in the undergrowth are *Viburnum grandiflorum*, *Berberis asiatica* and *Arundinaria* spp.

There are no habitations inside the reserve, but there are a few small villages (principally those of Karua and Mirsa) located just beyond its south-eastern boundary near the Seti river. Signs of human impacts within the reserve were largely confined to the area below Siano Khobang, a small pastureland at about 1,500 m. Above

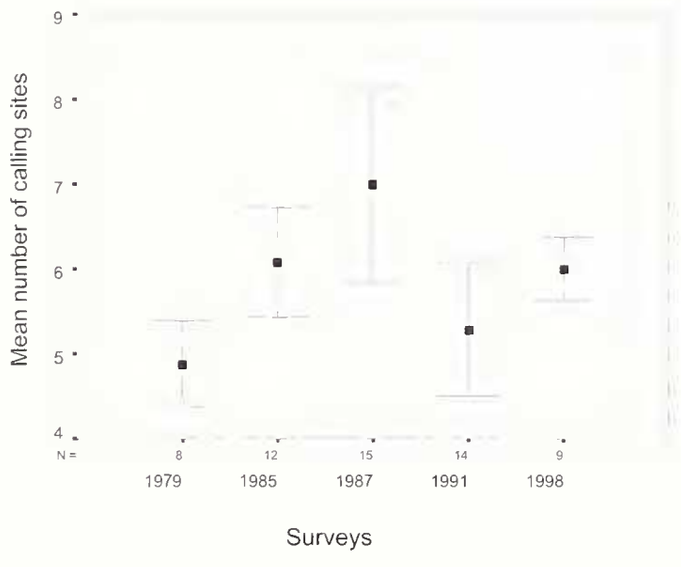

Figure 3: Mean number of calling sites of Satyr Tragopans heard at Pipar during different surveys from points (1-4). N = total number of points from where calling was heard over various days of a survey.

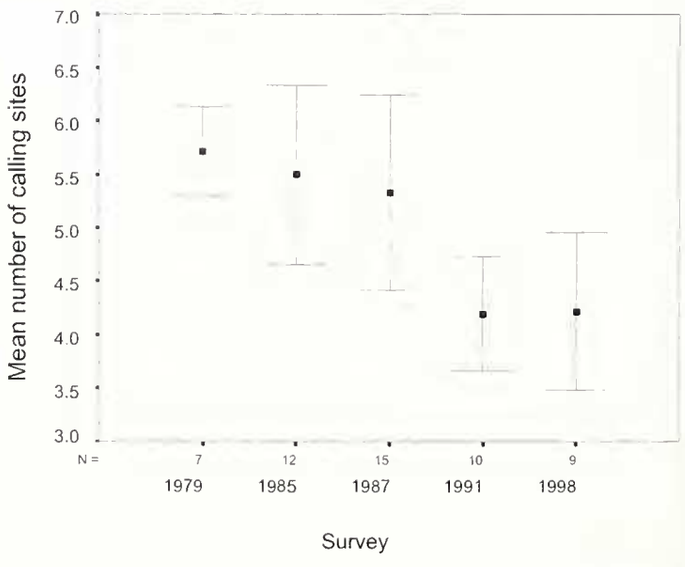

Figure 4: Mean number of calling sites of Koklass heard at Pipar during different surveys from points (1-4). N = total number of points from where calling was heard over various days of a survey.

here, the area seemed relatively undisturbed but for some shelters (goth) used by migratory graziers who move up with their flocks for the summer months (May – September).

We conducted call counts for four mornings in the Pipar bowl (30 April – 3 May 1998) and a further two mornings lower down. Two methods were employed to obtain abundance data on Galliformes.

a) Gaston's (1980) call count technique involved positioning observers at pre-determined points across the Pipar bowl before dawn. These observers plotted the apparent position of all calling individuals by species on a data-recording sheet. This protocol has been used in many studies on Himalayan pheasants (e.g. Gaston and Singh 1980, Garson 1983, Duke 1990, Khaling *et al.* 1998). We took care to eliminate any double counts between adjacent observation points by not recording birds 15 minutes after the first call from a species was heard. This was done because individual birds appear to move after being stationary or confined to a small area for the first 15-20 minutes after waking at their roosts.

We used the same observation points that were used in the earlier surveys in order to make our data comparable (Fig.2). In the previous counts at Pipar, observers always used Points 1–4, with Points 5 and 6 being added during the 1985 survey. In spring 1998, we did not conduct any call counts at Point 3 as it was difficult to reach in the darkness before dawn, especially with an obliterated track. We also considered that it was within the hearing range of points 2 and 4.

As calls of most galliform species are distinct and individually recognizable, observers could plot the location of each calling bird. Distant birds (faint calls), where direction and approximate location of the bird could not be ascertained, were not counted. Call counts were conducted regularly over 4 mornings in the Pipar Bowl and a further 2 mornings at Thullo-Khobang at a lower altitude (2,200 m). Observers reached their monitoring stations at 04h15, approximately 20-30 minutes before the time of the first call. Dusk call counts were also attempted, but birds did not call consistently and the counts were abandoned.

b) We also conducted systematic walks along the existing trails within the study area, in order to record sightings of galliform species. Observers walked pre-set trails through different habitat types. Walks were generally conducted after call counts between 10h00 and 13h00, and were timed so that rates of encounter could be generated for each species seen.

We used different routes for different species, i.e. wooded forests for Satyr Tragopan and alpine grasslands for Himalayan Monal and thus spent different times in different habitats.

Data analysis

We included all counts of calling birds from points 1-4 in the Pipar bowl for all mornings for each survey. Thus we obtained a mean value ± S.E. representing the number of callers heard from one call point across one survey. Such data were available for five surveys for Satyr Tragopan and Koklass. These data were subjected to one way ANOVA to test for differences in the number of birds of either species heard during different surveys. We have taken into analysis the actual number of birds heard from each call count point and not the corrected numbers (for duplications). We also conducted non-parametric tests (Kruskal-Wallis) to check for differences in calls heard from various call count points over successive surveys.

We also ran a Generalized Linear Model (GLM) with surveys as factors and dates of survey as co-variates. This was done to see if the timing of the survey had any effect on the calling of birds since the five surveys were conducted on varying dates (between 19 April – 23 May). All the statistical tests were conducted using SPSS 7.5.

RESULTS

Call counts

Koklass Pheasant, Satyr Tragopans and Hill Partridge were heard calling regularly each morning in 1998. Himalayan Monal was also heard but its calling is sporadic and not amenable to counts. No Blood Pheasants were heard.

A GLM conducted on calls of the two species of pheasants by year with dates as co-variates showed no significant variation in Satyr Tragopans ($F=1.103$, NS), and Koklass Pheasants ($F=0.32$, NS).

Satyr Tragopan

The mean number of Satyr Tragopan heard calling per survey did not vary significantly across different surveys ($F = 0.903$, $df = 4$, one-way ANOVA). These means were associated with large standard errors (Fig. 3). When counts from individual points were compared with themselves over all five surveys, only point 3 showed variation across years ($H = 8.89$, $df = 3$, $P < 0.05$; Kruskal-Wallis test).

We also conducted call counts for two mornings at a site lower than Pipar called Thullo Khobang (2,200m). From the two call count stations, two Satyr Tragopans were heard. Both calls came from above the call count positions, indicating that probably there were no Satyr Tragopans below the altitude at which the call counts were conducted.

Table 1. Encounter rates of some species of Galliformes sighted in Pipar during 1998.

Species	No. of Individuals	No. of Encounters	Observer Effort (Party hrs)	Encounter Rate (/100hrs)
Himalayan Monal	15	10	41.08	24.3
Satyr Tragopan	3	3	29.2	10.3
Hill Partridge	10	5	29.2	17.1

Koklass Pheasant

The mean number of Koklass heard from points 1-4 across different surveys did not vary significantly ($F = 0.706$, $df = 4$, one-way ANOVA) (Fig. 4). However, Koklass calling varied significantly ($H = 24.87$, $df = 3$, $P < 0.001$) between points 1-4 when data were considered for all surveys. From the three call count positions in Thullo-Khobang, we heard only one Koklass from above.

In Pipar, we also heard some calls of Himalayan Monal but the calling was brief and too irregular to allow any computation of their abundance.

Trail monitoring

Results from trail walks are presented in Table 1. A brief account of Galliformes seen in Pipar is presented below.

Himalayan Monal: This pheasant was encountered 10 times during the survey. In all, 15 birds were sighted (8 males and 7 females), all at 3,300—4,100 m. Most sightings (8) occurred in grassy areas, although two sightings took place in rhododendron forests adjoining the grasslands. This pheasant registered the highest direct encounter rate, probably by virtue of its high visibility and flushing behaviour.

Satyr Tragopan: This species was seen on three occasions, always solitary males within or close to rhododendron forests at around 3,300 m. This species is known to be shy and is not easily seen in its forested habitat.

Hill Partridge: Ten individuals of this species were seen at altitudes of 2,200—3,600 m. Four of the five observations occurred in forested areas.

Koklass Pheasant: One Koklass was seen on the first day at Pipar at 3,340 m. Although heard throughout the survey, this species was never subsequently sighted.

Chukar *Alectoris chukar*: This species was heard and sighted twice in Pipar, on both occasions above 3,400 m. There is no mention of this species from Pipar in earlier reports.

Rufous-throated Partridge *Arborophila rufogularis*: Calls thought to be those of the Rufous-throated Partridge were heard from Diprang area (1,500 m). However, a visual confirmation of these birds is required to confirm its presence in this area.

Black Francolin *Francolinus francolinus*: Calls of this species were heard near Gachok at approximately 1,200 m.

Heavy fog for the duration of the survey made it difficult to locate higher-altitude Galliformes (snowcocks and Snow Partridge). We found no evidence of Kalij Pheasant *Lophura leucomelanos*, which is known to occur at lower altitudes, close to the villages (Picozzi 1987).

DISCUSSION

Call counts

Minor variations in call counts between different surveys are expected, either due to real variations in numbers or inconsistency in calling of birds (Young *et al.* 1987). However, the 60% increase documented by Howman and Garson (1993) (see Appendix 1) seems to be due to double counting of individual birds, especially when a single caller calls from two or more calling sites. Such inaccuracies may occur when the time spent on call counts is more than 15-20 minutes (Gaston 1980). Very often birds will move towards the direction of other callers after this time thereby giving the impression that more birds are present.

Limitations of the call count technique have been discussed before (Duke 1990, Khaling *et al.* 1998). One of the main sources of error arises from individual observers hearing calls differently. Although this can be controlled to some extent by rotating one observer between points on different mornings, such practices may not eliminate the errors altogether, especially in the case of faintly heard birds. The inconsistency of bird calling is another source of error, which may affect results in short surveys (Young *et al.* 1987). Some birds may not call each morning and thus data generated from short surveys may be prone to a high level of error. A third problem is judging the distance from the listener to the bird, especially in the case of faintly heard birds. This becomes important when an observer has to decide whether to count or ignore a bird he/she can only just hear. It is, therefore, desirable to conduct the counts for 4-5 successive mornings to provide an opportunity for observers to hear a representative sample of birds in the area and also to compensate for effects of varying weather conditions. Density indices based on call counts may provide erroneous results, especially if counts are done by inexperienced observers and if the duration of survey is short.

In the past survey reports of call counts at Pipar, the highest number of calls heard on one particular morning during the survey has been considered a representative count of the area for that survey (Picozzi 1987, Howman and Garson 1993). However, the calling of birds may be affected by several factors, including weather and time of the day and year. Therefore, using the largest number of birds heard during a survey as an index of abundance to make comparisons between various surveys may be prone to error. The most reliable population index that can be derived from counts of the type we carried out appears to be the mean number of callers heard across all points and all mornings for a survey. Such an estimate will take into account the daily variations associated with calling and allows computation of an error on the mean. For example, during the 1991 survey, Howman and Garson (1993) reported 30 Satyr Tragopans as the highest count heard from four call count points on one particular morning, an apparent increase of 60% from the preceding survey in 1987 (Picozzi 1987). Kaul and Shakya (1998) reported that the number of Satyr Tragopan callers had declined to a maximum of 12 callers on a morning. However, the mean number of calls heard per site was higher in 1998 (6 ± 0.4) than in 1991 (5.3 ± 0.8).

There is apparently no damage to habitat and, from the accounts of the wildlife guard, negligible hunting of Galliformes occurs here. The figures obtained for Satyr Tragopan from call counts in 1998, despite being the lowest recorded in this project, are still healthy when compared with some other areas supporting Satyr Tragopan, e.g. Darjeeling (Khaling *et al.* 1998). The same may not be said about Koklass, which has been recorded in much higher abundance in certain areas of Himachal Pradesh, India (Gaston *et al.* 1981), and Pakistan (Severinghaus 1979). However, data indicate that there have been no significant changes in the population of Satyr Tragopan and Koklass in the Pipar Bowl and that they are stable.

The present area of call counts is close to the upper altitudinal limit for Satyr Tragopan and Koklass and it would be revealing to see how they are distributed lower down. Our counts around Thullo-Khobang suggest that they are not found lower than Thullo-Khobang at this time of the year and, therefore, the most promising altitude at which to conduct the counts would be somewhere higher. A trail/transect might be marked out at 2,600-2,700 m and call counts conducted for Satyr Tragopan and Koklass in the temperate forests just below the Pipar Bowl.

CONSERVATION

Pipar Reserve forms a part of the larger Annapurna Conservation Area, which is one of the most popular trekking localities in Nepal. The damaging impact of large scale and unplanned tourism became apparent in the late 1970s.

The Pipar Reserve appears to be relatively safe as the locals have taken a decision to conserve this area, which in any case is not on any authorized trekking route. It is also relatively free from poaching, although on occasions some hunting groups have been known to operate here. Such incidents are not very common and probably do not cause much harm to the animal populations.

Looking at the galliform figures for the last two decades, it appears that their populations are healthy. With species like the Himalayan Tahr *Hemitragus jemlahicus*, mainland Serow *Naemorhedus sumatraensis*, Asiatic Black Bear *Ursus thibetanus* and over 225 species of birds (Forester and Lelliott 1992, Kaul and Shakya 1998) being present here, it may be only a matter of time before special interest tourists become attracted to this area.

Pipar is a small reserve of only 46 km^2, and is therefore susceptible to ecological damage under tourist pressure. Efforts should, therefore, be directed towards reducing the impacts on wildlife that may arise from the plan to open this area as a tourist destination. This can primarily be achieved through regulated tourist volumes via entry fees, and by increasing the size of Pipar so that impacts may be either rotated amongst several routes, or else distributed evenly across larger areas, including the Pipar bowl.

The area above the village of Santal, adjacent to the east bank of the River Seti, is uninhabited and could provide a contiguous extension of the Pipar sanctuary. This area lacks a biological inventory and therefore cannot at present be compared with Pipar Reserve. It is, therefore, important to survey that area before considering it as an extension of Pipar.

Pheasant abundance, through both call counts and trail walks could be useful tools to use as biological indicators of tourism related impacts in Pipar. Thus, data on the pheasant populations at Pipar in the past and at the present time assume considerable significance. Such biological monitoring should be extended to the Santal area, and perhaps other areas in the upper Seti watershed. If possible, counts should be conducted at regular intervals. These surveys should also include a proper training element directed at the local people, in order to build their capacity to conserve an area that may be of crucial importance to their future livelihood.

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APPENDIX 1

Call count data available for pheasant surveys in Pipar bowl 1979-1998

Species/date	Source	No. of callers heard from points			
		1	2	3	4
Satyr Tragopan					
21.5.79	Lelliott 1981	3	4	7	5
23.5.79		3	5	6	6
1.5.80	Lelliott 1981	-	-	7	4
29.4.81	Tamarkar and Lelliott 1981	?	?	?	?
19.5.82	Yonzon 1982	?	?	?	?
28.4.83	J. Roberts *in litt.*	?	?	?	?
12.5.85	WPA Party	5	4	6	-
13.5.85	— ditto —	6	3	6	-
14.5.85	— ditto —	-	-	9	8
16.5.85	— ditto —	4	4	8	10
19.4.87	Picozzi 1987	5	3	13	5
20.4.87	— ditto —	5	4	14	3
21.4.87	— ditto —	3	5	14	-
23.4.87	— ditto —	5	6	15	5
20.4.91	Howman & Garson 1993	3	3	1	
21.4.91	— ditto —	10	6	5	5
22.4.91	— ditto —	7	6	7	10
23.4.91	— ditto —	0	4	7	5
30.4.98	Kaul & Shakya 1998	4	5	-	-
1.5.98	— ditto —	6	6	-	6
2.5.98	— ditto —	-	8	-	6
3.5.98	— ditto —	-	6	-	7
Koklass Pheasant					
21.5.79	Lelliott 1981	5	6	7	5
23.5.79		-	6	7	4
1.5.80	Lelliott 1981	?	?	?	?
29.4.81	Tamarkar and Lelliott 1981	?	?	?	?
19.5.82	Yonzon 1982	?	?	?	?
28.4.83	J. Roberts *in litt.*	?	?	?	?
12.5.85	WPA Party	7	7	6	-
13.5.85	— ditto —	6	5	8	-
14.5.85	— ditto —	-	-	9	0
16.5.85	— ditto —	4	6	8	0
19.4.87	Picozzi 1987	4	3	6	0
20.4.87	— ditto —	5	6	6	0
21.4.87	— ditto —	6	5	9	0
23.4.87	— ditto —	6	12	11	1
20.4.91	Howman & Garson 1993	7	3	4	-
21.4.91	— ditto —	5	7	4	2
22.4.91	— ditto —	-	-	-	-
23.4.91	— ditto —	-	-	-	-
30.4.98	Kaul & Shakya 1998	3	7	-	-
1.5.98	— ditto —	5	6	-	1
2.5.98	— ditto —	-	6	-	2
3.5.98	— ditto —	-	6	-	2